

Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed October 21, 2003. An appropriate Petition for Extension of Time to Respond is submitted herewith, together with the appropriate fee.

Claims 1-16 and 21-24 were pending in the Application prior to the outstanding Office Action. In the Office Action, the Examiner rejected claims 1-16 and 21-24. Claims 17-19 had been withdrawn. The present Response cancels claims 17-19, amends claims 1 and 21-24 and add new claims 25-29. Reconsideration of the rejections is requested.

The claims have been amended to among things, include limitations regarding the ribbon coil configuration. Support is found, for example, paragraph 0032 of the published application.

In the Office Action new drawings were required. The formal drawings are being submitted herewith. In Figure 1a, the reference number 100 has been added. As indicated in the first sentence of paragraph 0023, Figure 1a shows an exemplary plasma processing system 100 with a processing chamber 102. The informal drawings did not have the reference number 100. Entry of the formal drawings is respectfully requested.

Claims 1 and 24 were rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement. The Examiner states that the specification does not show or disclose that the helical electrode is a 3-dimensional helical electrode.

Claims 2-16 and 21-23 were also rejected because they depend on the rejected base claim.

Applicants submit that even though the phrase "3-dimensional" helical electrode was not used, it is apparent from the drawings of the electrode in Figures 2a, 2b and 2c, for instance, that the

configuration is three dimensional in that it is not linear or planar. Nevertheless to expedite prosecution the phrase "3-dimensional" has been deleted from the claims.

Claims 1 and 21-23, were rejected under 35 USC 102(b) as being anticipated by Ngan, (US Patent No. 5,919,342).

With respect to claim 1, Ngan is said to disclose an apparatus to perform semiconductor processing, comprising: a process chamber; a plasma generator for generating a plasma in the process chamber; and a helical electrode coupled to the output of the plasma generator.

With respect to claims 21-23, Ngan is said to disclose the helical electrode is helical coil, wherein the spiral turns are similar in size, and has an elongated cross section.

Applicants agree with the Examiner to the extent that the cited reference Ngan discloses a helical electrode. However, as shown in Figure 2, the helical coil 186 which has a circular cross section. (See column 1, line 44). In contrast the claimed invention employs a helical ribbon electrode where the coil has a width that is greater than its thickness or has an elongated cross section.

Claims 2-9, 12-16 and 24 were rejected under 35 USC 103(a) as being unpatentable over Ngan, and in view of Qian et al. (US Patent No. 6,447,636).

With respect to claims 1 and 24, Ngan, is said to disclose a multi-layer processing chamber, comprising a gas source coupled to the chamber for introducing a processing gas into a reaction chamber having a sample disposed therein; a solid state RF plasma source coupled to the chamber to excite the processing gas; and a helical electrode adapted to excite the plasma.

The Examiner concedes that Ngan does not clearly teach a controller coupled to the RF plasma to pulse the RF plasma source for each deposited layer.

However, Qian et al. is said to disclose a system controller coupled to the solid state RF plasma source to pulse the solid state RF plasma source 105 for each deposited layer. The Examiner concluded that it would have been obvious to combine the controller teaching of Qian et al. with Ngan's plasma chamber, because it would have improved the characteristic, such as uniformity of the deposited layer as taught by Qian et al.

Applicants admit that even if the secondary reference Qian et al. teaches the art as suggested by the Examiner, the reference nevertheless does not cure the deficiencies of Ngan. As shown in Figure 1, the semiconductor wafer processing system includes an antenna 102 that is a multiple concentric spiral coil having windings which conform to the shape of the dome. (See column 3, lines 65-67). As is apparent, the antenna coils have circular cross sections

Claims 10 and 11 were rejected under 35 USC 103(a) as being unpatentable over Ngan, and Qian et al. as applied to claim 1 above, and further in view of Ishizuka et al.

The Examiner concludes that Ngan does not disclose wherein the distance between the helical electrode and a workpiece is less than five inches. However, the Examiner states that Ishizuka et al. discloses an apparatus that is adapted to receive a workpiece W in the chamber 1 and wherein the distance between the coil electrode 13 and the workpiece W is less than five inches.

Finally, Applicants submit that even if Ishizuka et al. teach the art as suggested by the Examiner, this reference nevertheless does not cure the deficiencies of Ngan. As shown in Figure 2 and described at column 6, line 61 etc., the reference employs an electrode 13 that is a coil which is in the form of a plane spiral extending parallel to the wafer mount. Again, the coil has a circular cross section which is different from the claimed ribbon electrode.

Application No.: 09/898,439
Amendment/Response dated: April 21, 2004
Reply to OA dated: October 21, 2003

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

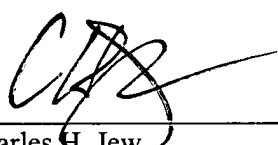
Enclosed is a PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136 for extending the time to respond up to and including today, April 20, 2004.

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The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: April 21, 04

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